



Effects of El Niño/southern oscillation on simulated phosphorus loading in south Florida

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Abstract:

The El Niño/Southern Oscillation (ENSO) is a global climate phenomenon with strong effects on Florida's weather patterns. ENSO has been shown to have predictable effects on streamflow, rainfall, and crop yield; however, the relationship between N and P loading and ENSO has not been previously explored. Nutrient loads for a Lake Okeechobee sub-basin for 1965-2001 were simulated with the Watershed Assessment Model (WAM) and compared to measured P loads. The NS coefficients for simulated and measured monthly P loads were 0.73 for the calibration period and 0.63 for the validation period, which indicates "satisfactory" to "good" model performance. With a probable error range (PER) of $\pm 27.8\%$ for measured P loads, the modified NS coefficients increased to 0.94 for the calibration period and 0.93 for the validation period. Results showed that ENSO strongly affected simulated seasonal and monthly phosphorus runoff. El Niño years produced seasonal peak loads of P runoff into Lake Okeechobee significant at the 99% level during the spring (February-April), which indicates dominance of positive load anomalies. La Niña years produced significant seasonal peak loads in the summer (May-July) but with much greater variability in loads. Neutral years exhibited less predictable seasonal loading, although simulated P loads were generally similar to measured long-term means. Nutrient loading patterns during specific ENSO phases were comparable to previously explored precipitation and streamflow patterns in south Florida. This research has potential for use by land and water managers who can add short-term ENSO-based climate forecasts to their toolbox for reducing nutrient runoff. © 2007 American Society of Agricultural and Biological Engineers.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

El Nino Southern Oscillation, Extreme Weather Event, Food/Water Quality, Precipitation

Food/Water Quality: Chemical

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Climate Change and Human Health Literature Portal

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content